

CLAIMS:

1. Data processing apparatus comprising:

receiving means for receiving a data structure
5 defining grammar rules for recognition of a natural
language input;

analysing means for analysing the data structure to
identify positions in the grammar rules at which pauses
can occur in the natural language input; and

10 generating means for generating a modified data
structure defining modified grammar rules for recognition
of a natural language input with pauses therein.

2. Data processing apparatus according to claim 1,
15 wherein said analysing means is adapted to identify the
positions in accordance with pause criteria for the
natural language input.

3. Data processing apparatus according to claim 1 or
20 claim 2 wherein said generating means is adapted to add
marker means to the identified positions in the grammar
rules at which pauses can occur in the natural language
input to generate the modified data structure.

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4. Data processing apparatus according to ^{claim 1 or 2} ~~any preceding~~
~~claim~~ wherein said generating means is adapted to
fragment the grammar rules in accordance with said
identified positions to generate sub grammar rules to
5 form said modified data structure.

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5. Data processing apparatus according to claim 4,
wherein said generating means is adapted to form a
hierarchical structure using said sub grammar rules to
10 form said modified data structure.

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6. Data processing apparatus according to ^{claim 1 or 2} ~~any preceding~~
~~claim~~ wherein said receiving means is adapted to receive
a data structure defining grammar rules for use in speech
15 recognition of a natural language speech input, and said
generating means is adapted to generate said modified
data structure defining modified grammar rules for speech
recognition of a natural language speech input with
pauses therein.

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7. Data processing apparatus according to ^{claim 1 or 2} ~~any preceding~~
~~claim~~ wherein said receiving means is adapted to receive
said data structure defining grammar rules for
recognition of a natural language input as a first
25 modality input in conjunction with associated events in

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at least one further modality input, said data structure defining the association between events in each modality input, and events in said first modality input comprising units in the natural language.

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8. Data processing apparatus according to claim 7, wherein said analysing means is adapted to identify said positions in the grammar rules based on events in at least one said further modality input.

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9. Data processing apparatus comprising:

receiving means for receiving a data structure defining grammar rules for recognition of a natural language input;

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analysing means for analysing the data structure to identify positions in the grammar rules at which events in at least one further modality input can occur in the natural language input as a first modality input; and

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generating means for generating a modified data structure defining modified grammar rules for recognition of a natural language input as the first modality input in conjunction with associated events in a said further modality input, said data structure defining the association between events in each modality input, and

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events in said first modality input comprising units in the natural language.

10. Data processing apparatus according to claim 9, wherein said analysing means is adapted to identify positions in the grammar rules at which pauses can occur in the natural language input based on events in at least one said further modality input.

11. Data processing apparatus according to claim 7, 8, 9 or 10, wherein said generating means is adapted to generate a further modified data structure defining said modified grammar rules and the relationships with events in the or each further modality input.

12. A data processing method comprising the steps:
receiving a data structure defining grammar rules for recognition of a natural language input;

analysing the data structure to identify positions in the grammar rules at which pauses can occur in the natural language input; and

generating a modified data structure defining modified grammar rules for recognition of a natural language input with pauses therein.

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13. A data processing method according to claim 12, wherein the analysing step includes identifying the positions in accordance with pause criteria for the natural language input.

14. A data processing method according to claim 12 or claim 13, wherein the generating step includes adding marker means to said data structure to identify the positions in the grammar rules at which pauses can occur in the natural language input.

15. A data processing method according to ~~any one of~~
~~claims 12 to 14~~ ^{claims 12 or 13} wherein the generating step includes
fragmenting the grammar rules in accordance with said
identified positions to generate sub grammar rules to
form said modified data structure.

16. A data processing method according to claim 15 wherein the generating step includes forming a hierarchical structure using said sub grammar rules to form said modified data structure.

17. A data processing method according to ~~any one of~~
claim 12 or 13
~~claims 12 to 16~~, wherein the receiving step comprises
receiving a data structure defining grammar rules for use

in speech recognition of a natural language speech input,
and the generating step comprises generating a modified
data structure defining modified grammar rules for speech
recognition of a natural language speech input with
5 pauses therein.

18. A data processing method according to ~~any one of~~
claim 12 or 13 ~~claim 12 to 17~~, wherein the receiving step comprises
receiving a data structure defining grammar rules for
10 recognition of a natural language input as a first
modality input in conjunction with associated events in
at least one further modality input, said data structure
defining the association between events in each modality
input, events in said first modality input comprising
15 units in the natural language.

19. A data processing method according to claim 18,
wherein the analysing step comprises identifying said
positions in the grammar rules based on events in at
20 least one said further modality input.

20. A data processing method comprising:

receiving a data structure defining grammar rules
for recognition of a natural language input;

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analysing the data structure to identify positions in the grammar rules at which events in at least one further modality input can occur in the natural language input as a first modality input; and

5 generating a modified data structure defining modified grammar rules for recognition of a natural language input as the first modality input in conjunction with associated events in a said further modality input, said data structure defining the association between
10 events in each modality input, and events in said first modality input comprising units in the natural language.

21. A data processing method according to claim 20, wherein the analysing step comprises identifying
15 positions in the grammar rules at which pauses can occur in the natural language input based on events in at least one said further modality input.

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A 20 22. A data processing method according to claim ~~18, 19,~~
~~20 or~~ 21, wherein the generating step includes generating a further modified data structure defining said modified grammar rules and the relationships with events in the or each further modality input.

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23. Apparatus for generating data in a computer usable form, the apparatus comprising:

receiving means for receiving a natural language input with a number of pauses therein; and

5 recognition means for recognising said natural language input using the modified data structure generated using the method of any one of ^{claims 12, 13, 20 or 21} ~~claims 12 to 22~~ to generate data in computer usable form.

10 24. Apparatus according to claim 23, wherein said recognising means comprises speech recognition means for recognising a natural language speech input.

15 25. A method of generating data in a computer usable form, the method comprising receiving a natural language input with a number of pauses therein; and

20 recognising said natural language input using the modified data structure generated using the method of ^{claim 20} ~~any one of claims 12 to 22~~ to generate data in computer usable form.

25 26. A method according to claim 25, wherein the recognising step comprises speech recognition of a natural language speech input.

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27. Apparatus for generating data in a computer usable form, the apparatus comprising:

first modality receiving data generated for a natural language input by the apparatus of claim 23 ~~or~~ claim=24, said data comprising recognised units of the natural language and comprising data of a first modality input;

further modality receiving means for receiving data identifying events in at least one further modality input;

data structure receiving means for receiving a further modified data structure defining modified grammar rules and the relationships with events in the or each further modality, said further modified data structure having been generated using the method of claim 18;

analysing means for analysing the first modality input data and the or each further modality input data to determine if they match with any said modified grammar rule and related events in the or each further modality; and

generating means for generating computer usable data in dependence upon said analysis by said analysing means.

28. Apparatus according to claim 27, wherein said first modality receiving means is adapted to receive

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modality, said further modified data structure having been generated during the method of claim 22;

analysing the first modality input data and the or each further modality input data to determine if they match with any said modified grammar rule and related events in the or each further modality; and

generating computer usable data in dependence upon said analysis.

31. A method according to claim 30 wherein the first receiving step comprises receiving recognition data comprising an ordered list of likely natural language units to accompany the most likely natural language unit for each natural language unit recognised, and the analysis step includes using the ordered list when the most likely natural language units do not result in a match with any modified grammar rule and related events in the or each further modality.

32. A method according to ~~claim 30~~ or claim 31, wherein the first receiving step receives speech recognition data.

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33. Processor implementable instructions for controlling
a processor to carry out the method of any one of claims

12, 20, 21, or 22

12 to 22, 25, 26 or 30 to 32.

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34. A carrier medium for carrying the processor
implementable instructions according to claim 33.

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